



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,633	01/22/2004	Susan G. Yan	GP-303571	7710

7590 01/24/2007
CARY W. BROOKS
General Motors Corporation, Legal Staff
Mail Code 482-C23-B21
P.O. Box 300
Detroit, MI 48265-3000

EXAMINER

WALKER, KEITH D

ART UNIT	PAPER NUMBER
----------	--------------

1745

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/763,633

Applicant(s)

YAN ET AL.

Examiner

Keith Walker

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement filed on 1/22/04 has been placed in the application file and the information referred to therein has been considered as to the merits.

Drawings

The drawings received on 1/22/04 are acceptable for examination purposes.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

1. Claims 3, 4, 15, 18 & 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear where the carbon comes from for the ratio with the ionomer.
2. Claims 3, 4, 15, 18 & 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what units are for the ratio such as weight percent or volume percent.

Art Unit: 1745

3. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what is meant by "half the ionomer concentration", half of what concentration and compared with what and in what unit of measurement.

4. Claim 8 recites the limitation "the ionomer concentration" in line 2. There is insufficient antecedent basis for this limitation in the claim.

5. Claim 9 recites the limitation "the membrane" in line 1-2. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear how the clamping of the membrane fits in with the spraying of the catalyst ink. Is the proton conducting membrane put into a clamp before spraying the ink? Is the proton conducting membrane put into a clamp after the spraying? If the clamp is used before the spraying, then what type of clamp is used such that the clamp doesn't mask the membrane?

Claims depending from claims rejected under 35 USC 112 are also rejected for the same.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1, 7, 8, 10, 11, 16, 17 & 20 are rejected under 35 U.S.C. 102(b) as being anticipated by US Publication 2002/0034675 (Starz).

Starz discloses a method of making a membrane electrode assembly (MEA) consisting of spraying catalyst ink on both opposite surfaces of a proton conducting membrane in the protonated form ([0031, 0032, 0054]). The MEA is then soaked in sulfuric acid and then in water.

Regarding claims 16, 17 & 20, the process of spraying the catalyst ink or the process of first spraying the ionomer and then spraying the catalyst ink are seen as are seen as product-by-process and even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a

Art Unit: 1745

different process (MPEP 2113). The product disclosed by Starz is an MEA comprised of a proton conducting membrane with catalyst ink on both sides of the membrane, which is the same as the final product of the instant claims and therefore the claims are anticipated.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2, 5, 6, 13 & 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2002/0034675 (Starz).

The teachings of Starz as discussed above are incorporated herein.

Starz is silent to first spraying on the ionomer and then spraying on the catalyst ink. Starz teaches mixing the ionomer and the catalyst together and spraying the combination in one step as opposed to two separate steps. It would have been obvious to one skilled in the art to separate spraying in one step a single known combination into two separate spraying steps comprising the two components of the combination, since it is held that separating known integral components into various elements involves only routine skill in the art (MPEP 2144.04).

Starz is silent to using a heat lamp for drying the membrane. Starz teaches using a circulating air oven for drying the membrane. Since no criticality has been given

Art Unit: 1745

to the use of the heat lamp for the drying of the membrane and in the absence of unexpected results, the use of the oven to dry the membrane is seen as an equivalent drying process as the claimed heat lamp.

Starz is silent to spraying multiple layers to acquire a desired thickness. It would have been obvious to one skilled in the art to spray on multiple layers to achieve a desired thickness.

4. Claims 2, 6 & 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2002/0034675 (Starz) in view of US Patent 6,277,513 (Swathirajan).

The teachings of Starz as discussed above are incorporated herein.

Starz is silent to first spraying on the ionomer and then spraying on the catalyst ink, spraying multiple layers, using a heat lamp and hot pressing the MEA.

Swathirajan teaches making an MEA with layered electrodes consisting of a first layer having an ionomer layer without a catalyst and then a second layer comprising the catalyst is applied on top of the first layer (Abstract, 7:1-15). A heat lamp is used to dry the catalyst layer (9:5-15). After the membrane is coated on both sides, the assembly is hot pressed forming the final MEA with both electrodes (7:35-50). This process of making a layered electrode improves catalyst utilization in the fuel cell and improves reactant gas diffusion (1:40-46, 2:40-45).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the fuel cell of Starz with the layered

Art Unit: 1745

electrode of Swathirajan to increase the catalyst utilization, which reduces the amount needed and therefore reduces the manufacturing cost of the electrodes.

5. Claims 5 & 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2002/0034675 (Starz) in view of US Patent 5,330,860 (Grot).

The teachings of Starz as discussed above are incorporated herein.

Starz is silent to using a heat lamp and hot pressing the MEA.

Grot teaches using a heat lamp and pressure to fix the catalyst ink onto the membrane (8:15-50). The heat and pressure securely bind the catalyst ink to the membrane to prevent delaminating of the electrode. The efficiently produced MEA does not crack or deform during operation and does not decrease the ionic conductivity of the structure, thereby improving the fuel cell performance (3:45-60, 4:15-25).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the MEA making process of Starz with the heating and pressure teachings of Grot to form a better MEA that will improve the fuel cell operation through reliability.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith Walker whose telephone number is 571-272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

Art Unit: 1745

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

K. Walker

GREGG CANTELMO
PRIMARY EXAMINER

Gregg Cantelmo
1/22/07

FOR PAT RYAN